



Richard B. Engelman
Director, Spectrum Resources
Government Affairs

Sprint Nextel
900 7th Street, NW
Suite 700
Washington, DC 20001

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Via Electronic Submission – Corrected (replaces Ex Parte dated March 7, 2012)

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W., Room TW-A325
Washington, D.C. 20554

Re: ***Written Ex Parte Communication: Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters***, WT Docket No. 10-4

Dear Ms. Dortch:

Sprint Nextel Corporation ("Sprint") hereby responds to a request from Commission staff that Sprint provide additional information regarding the technical specifications and other requirements that would be needed for Sprint to permit third-party signal boosters to be used on the Sprint network. This letter supplements Sprint's previous filings in the above-referenced docket.¹

Sprint supports the Commission's initiative to bring well-designed signal boosters to market. As stated previously, properly designed and installed signal boosters can aid wireless subscribers by expanding the usability of wireless networks in areas of poor signal coverage. Many signal boosters sold and deployed today, however, cause harmful interference or degrade the performance of wireless networks as a result of flawed design, poor installation, or lack of coordination with the affected carrier and its network.

Some commenters have proposed paths by which the Commission could move forward to expand the availability and use of signal boosters while ensuring that the signal boosters are designed, installed, and coordinated with the affected wireless network operator to avoid interference or degraded performance. Sprint supports some of these proposals with certain adjustments, as discussed below. It is essential, however, that any Commission decision in this proceeding: 1) continue to permit signal boosters to be used only under the license authority granted to the wireless network licensee; 2) require the signal booster owner, installer or user to

¹ *Comments of Sprint Nextel*, WT Docket No. 10-4, February 5, 2010, and *Reply Comments of Sprint*, WT Docket No. 10-4, August 24, 2011.

register or coordinate the signal booster with the licensee of the wireless network or networks it will be used with; 3) prohibit the marketing or use of signal boosters that do not comply with Commission technical regulations adopted in this proceeding; 4) prohibit the marketing to *consumers*, or use by *consumers*, of signal boosters designed for *commercial* use; 5) require that a signal booster be turned off upon request of the wireless network operator if it causes interference or is not properly coordinated; and, 6) adopt labeling and instruction manual requirements to ensure consumer and commercial entities understand they must coordinate use of the signal booster with the affected network and they must shut down its operation upon the request of the spectrum licensee if it causes harmful interference or network degradation.

Sprint also recognizes that some of the requirements proposed by commenters in this proceeding may not be feasibly achieved in the near future (for example, automating the registration process so that the signal booster only operates after the process is completed or requiring signal boosters to continuously transmit their location to the wireless network). Sprint does not object to the Commission adopting interim rules to significantly reduce signal booster interference provided there is a clearly defined timeline for adopting additional safeguards that further reduce the interference from signal boosters.

Sprint agrees with the proposal of Verizon Wireless and Wilson Electronics² (“Joint Verizon Wireless/Wilson Proposal”) to separate signal boosters into three categories that would be regulated differently, and provides comments below with respect to the various proposals within those categories.

Consumer Boosters

Sprint respectfully submits that consumer boosters must be required to meet detailed technical and registration requirements to prevent harmful interference and/or degradation of network performance. Sprint generally concurs with both the Joint Verizon Wireless/Wilson Proposal and the proposal in T-Mobile USA’s *Ex Parte* letter dated February 17, 2012. Sprint believes, however, the following refinements of these proposals are necessary for third-party consumer boosters to be acceptable for use on the Sprint network.

Output Power. Sprint’s network is designed to operate with devices that have power levels of no more than approximately 23 dBm output power to the antenna port. Sprint proposes that mobile consumer signal boosters and fixed signal boosters that use non-directional antennas be limited to 23 dBm output power to the antenna port and 25 dBm EIRP including antenna gain. The Verizon Wireless/Wilson proposal to permit a consumer booster to operate with EIRP as high as 30 dBm (1 Watt), or an even higher power level proposed by T-Mobile, would have the potential to cause significant interference to multiple cell sites since Sprint’s network has been designed to assume device power levels are never greater than 23 dBm.³

² *Ex Parte* Letter from John T. Scott, III and Andre J. Lachance, Attorneys for Verizon Wireless and Russell D. Lukas, Attorney for Wilson Electronics, Inc., dated July 25, 2011.

³ A cell site has the ability to adjust the power of the mobile device with which it is communicating to an appropriate level. It can also adjust the output power from a signal booster since the signal booster provides a fixed amount of power gain based on the input power from the mobile device. However, other cell sites not communicating with the mobile device and signal booster could receive higher levels of interference from a 30 dBm signal booster than the

Fixed consumer boosters that operate with directional antennas could have higher EIRP as proposed by the Joint Verizon Wireless/Wilson Proposal, but should be limited to 23 dBm output power to the antenna port.

Frequency Bands. The Joint Verizon Wireless/Wilson Proposal would limit consumer boosters to the cellular, broadband PCS, AWS-1, and 700 MHz bands. Sprint proposes that operation in the 2.5 GHz band be permitted, and that operation in Part 90 ESMR bands (817-824/862-869 MHz) by consumer boosters be permitted after the reconfiguration of the 800 MHz band is completed.

AGC Overload Control. The Joint Verizon Wireless/Wilson Proposal would require use of automatic gain control (AGC) to prevent booster overload. Sprint believes that the Commission should instead use the term automatic limiting control, or ALC, which would automatically limit the signal booster to transmitting at no more than its maximum permitted power level regardless of the input power. A signal booster should be a linear amplifier with a fixed gain (or perhaps with a level of gain that is set when a call or data session is initiated), subject only to reduction if the output power hits the maximum level permitted. It is important for proper operations that a network be able to adjust the power being transmitted by a device either up or down as needed to maintain the link, avoid interference, and reserve capacity for other users. *When a typical user device is operating within a wireless network through a signal booster, the signal booster's operations should not override the network's commands to the user device for adjusting power.* Sprint is concerned that the typical use of "AGC" would involve the dynamic, ongoing adjustment of the gain of the signal booster to maintain a constant, or near constant, output power. Such AGC circuitry has been found to cause noise problems and link latency that can significantly disrupt network performance. Thus, Sprint believes that traditional AGC circuitry in signal boosters should be prohibited.

Registration. Sprint requests that the information provided to a wireless network operator during registration of a consumer signal booster, as proposed in the Joint Verizon Wireless/Wilson Proposal, be expanded to include information on where the consumer booster would be used. In some cases, this might be the same as the address of the person registering the booster; however, in other cases consumer boosters might be bought for use at another location.

Certified Engineered and Operated (CEO) Boosters

Sprint submits that CEO boosters be required to meet detailed certification and coordination requirements to prevent interference and network degradation. Sprint generally agrees with the Joint Verizon Wireless/Wilson Proposal with the following adjustments to ensure CEO boosters properly perform on the Sprint network.

Design and Installation Requirements. The majority of negative network impacts from CEO boosters can be mitigated through standards focused on design and installation requirements. The Joint Verizon Wireless/Wilson Proposal outlines a Booster Certification System that Sprint believes would be a helpful start. In addition, Sprint requests that high-

23 dBm user devices they were designed to deal with. This increased interference could degrade network performance.

powered CEO boosters be permitted only after a certified engineer or technician completes a written analysis demonstrating engineering justification for its deployment. In addition, the Commission should require that the actual equipment installation should be completed by a certified engineer or technician.

Coordination. Coordination of CEO boosters with the wireless network operator or operators whose signals are being boosted permits wireless network operators to reduce the potential impact of the CEO booster on the loading of network base stations. Without proper coordination, CEO boosters have the potential to actually reduce a wireless network's coverage area and thus diminish the signal quality for other users near to the signal booster. High-power boosters also are capable of raising the noise level to detrimental levels.

Antennas. Sprint supports the installation and use of a narrow beam antenna (beamwidth of $\leq 40^\circ$) for CEO boosters to facilitate the network operator's management of various sectors and base stations.

Carrier Installed Boosters

Category expansion. Sprint respectfully submits that the "Carrier Installed Boosters" category proposed in the Joint Verizon Wireless/Wilson Proposal be expanded to "Carrier Installed or Carrier Marketed Boosters." Expanding this category, which is intended to include existing permitted uses for signal boosters, should allow for a wireless network operator to offer, under controlled conditions, unique, consumer-type boosters that don't fully comply with the interim consumer boosters requirements (for example, boosters with higher power, more antenna gain, or in additional frequency bands for which the wireless network operator is licensed). The wireless network operator could permit the signal booster owner or user to install the booster provided it conforms with the operator's installation instructions.

Pursuant to Section 1.1206 of the Commission's rules, this letter is being electronically filed with your office. Please let me know if you have any questions regarding this filing.

Respectfully submitted,

/s/ Richard B. Engelman

Richard B. Engelman
Director – Spectrum Resources
Government Affairs

cc: (via e-mail)
Roger Noel
Joyce Jones
Moslem Sawez
Thomas Derenge